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ABSTRACT

The effects of questions of different cognitive levels were investigated in four undergraduate classes involving a total of 80 students. Previous research suggested that questions may distract students from a lecture, and that students felt more confident about responding accurately to low-order questions. These results do not support previous findings that students are more confident in responding to questions when lower-order questions are presented. Nor were students more attentive in the no-question situation. It was speculated that perhaps anxiety interfered with students' confidence to respond to higher-order questions and students' metacognitive and attending behaviors. (Contains 1 table and 44 references.) (Author/SLD)

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The Effects of Questions and Anxiety on Attention, Question Confidence, and Metacognition

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D. Fasko

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Abstract

The effects of questions of different cognitive levels were investigated in four undergraduate classes. Previous research suggested that questions may distract students from a lecture and that students felt more confident about responding accurately to low order questions. It was speculated that perhaps anxiety interfered with students' confidence to respond to higher order questions and students' metacognitive and attending behaviors.

Type of Questions and Anxiety, Attention, Question Confidence and Metacognition

According to DeGarmo (1911), "to question well is to teach well" (p. 179). Questions are prevalent in all educational environments. In fact, many leading texts in educational psychology promote teacher questioning for preservice and beginning teachers, (e.g., Woolfolk, 1993). Also, Friedman (1992) stated recently that teachers should ask "thought-provoking", abstract questions to help students assimilate material. Moreover, asking questions skillfully may lead students to participate more actively in the lesson (Chuska, 1995).

It has been suggested (Fasko, 1983) that questions may direct the student's attention and processing effort, which would provide the link between the use of both high order questions (HOQs) (e.g., application) and low order questions (LOQs) (e.g., knowledge) and the assessment of their effects on student academic performance. Fasko (1983) also reported inconsistent results in studies of the effects of questions upon student responses and achievement.

Interestingly, Fasko (1983, 1988) found that students were more confident about their ability to respond accurately to LOQs than they were to HOQs. Perhaps this is because of past failures (Chuska, 1995). Chuska also reported that there are two sets of conditions that influence the students' decision to respond to questions posed by teachers. The first set includes the "student's knowledge, experiences, and ideas,...[which] determine the student's perception of his or her ability to respond to the question. The second set...concerns the student's attitudes, that is, whether the student wants to respond" (p. 54), or feels "comfortable" in responding. Fasko (1983, 1988) thus suggested that teachers could increase their students' confidence in class

by asking lower order level questions. Rowe (1974) also found that students' confidence in responding to questions increased when teachers increased their wait-time after presenting a question to about four seconds. Chuska (1995) suggested that the accuracy of a student's response could be affected by his or her attentiveness in class. Fasko (1983, 1988) recommended that, once students' confidence was strengthened by using LOQs, then HOQs could then be presented to facilitate the students' higher levels of cognitive processing. This supports Wilen's (1987) recommendation to "[A]sk questions at [a] variety of levels" (p. 10). Fasko (1983, 1988) speculated that assessing a student's question answering confidence to HOQs and LOQs would assist educators and researchers in determining the type of student cognitive processing and also in determining the student's cognitive ability.

Additionally, Fasko's (1983, 1988) results suggested that students were least attentive when HOQs were asked. This finding contradicts Chuska's (1995) suggestion to use open-ended questions to "grab" students' attention. Because Fasko's (1983, 1988) findings indicated that students tended to be more attentive when no questions (NQ) were asked, it was suggested that teachers consider a minimal or more judicious use of questions in order to avoid possible distraction of students from the task at hand, (e.g., lecture). Perhaps, as suggested by Langer (1997), when students are distracted they are attracted to something else. In addition, she suggested that educators vary the stimuli, (e.g., types of questions), so that students would sustain their attention.

Perhaps questions are distracting, thereby causing inattention. Research reported previously (Fasko 1983, 1988) are consistent with Kounin and Doyle (1975) who found that conditions such as interspersing questions in a class causes a reduction in attending behaviors.

In a typical situation, such as lecturing or reading to the class, the teacher acts as a continuous signal. But, according to Kounin and Doyle, a reduction in attending behavior occurs when, for example, the teacher asks a question or requires recitation. This action thus becomes a discontinuous signal.

Attention

Perhaps this difficulty can be explained by the split-attention effect suggested by Chandler and Sweller (1992). They demonstrated that when students read text, which includes diagrams, they split their attention between the text and diagrams. This requires more effort and capacity necessary for the learner to accomplish the task. Thus, it is possible that this split-attention effect occurs also between the cognitive processing of lecture material and the requirement to respond to a teacher directed question.

There are, however, important aspects of a stimulus that would influence students attention to that stimulus. According to Piontkowski and Calfee (1979), a teacher should either emphasize critical features of a stimulus, eliminate irrelevant features, or put an old stimulus into a new context in the classroom. Moreover, directing attention to relevant features of a stimulus is an external event of learning (Gagne', 1977). The external conditions, (e.g., the concreteness of a stimulus), can be manipulated to increase one's attentiveness to messages (Triesman, 1969). Berliner (1976) also stated that the effectiveness of a teacher's questions depends upon engaging and sustaining the student's attention. Perhaps, as Berliner (1976) stated, the link between teacher behavior (e.g., questioning) and student achievement is the student's active time on task. Thus, the judicious use of questions should facilitate students' attention as well as subsequent learning outcomes.

Anxiety

However, perhaps Fasko's (1983, 1988) findings can be explained by certain personality or situational variables such as anxiety. According to Spielberger (1983) anxiety may be classified into two concepts, state anxiety (S-Anxiety) and trait anxiety (T-Anxiety). Trait anxiety refers to a relatively stable characteristic where one is prone to be anxious, whereas S-Anxiety refers to a distinct reaction occurring at a specific time (Spielberger, 1983). According to Spielberger, "Anxiety states are characterized by subjective feelings of tension, apprehension, nervousness, and worry..." (1983, p. 1). Specific to the academic arena is test anxiety, (i.e., anxiety propagated and sustained in a situation of extrinsically imposed evaluation). Test anxiety is considered to have two components: a worry, or cognitive component, refers to negative thoughts that disrupt performance; an emotionality component refers to the affective and physiological aspects of anxiety (Pintrich, Smith, Garcia, & McKeachie, 1991). Test anxiety has been found to negatively influence a learner's expectancy of successful completion of the task, (i.e., a domain specific test or examination) at hand (Pintrich et al., 1991; Williams, 1996; Zohar, 1998), as well as the learners' general academic performance (Pintrich et al., 1991).

In addition, Tobias (1979) reported that high anxiety is related to decrements to student performance. Tobias also noted that there has been a lack of consistency in research results on anxiety-instructional methods interactions. Interestingly, Dillon (1981) suggested that teachers who use too many questions in class may evoke anxiety in their students. To reduce these effects, Chuska (1995) suggested that questions should be posed in a nonthreatening manner. Prior to the present study and that of Fasko (1991), the effects of anxiety and classroom questions on academic performance were studied by McKenzie and Henry (1979) and McKenzie

and Schadler (1980) who found that students who were presented questions in a test-like fashion were shown to increase time on-task and outperformed an individually addressed questions group and control group on posttest measures of achievement. They also found no differences in anxiety between groups. However, the anxiety scale seemed to measure student attitudes rather than anxiety levels (Fasko, 1983).

In a related study, Fernandez (1976) found no differences between high level and low level anxious students on recall of content. Also, there was no relationship between anxiety and teaching technique. However, Kreitzberg (1978) found that high level anxiety students recalled fewer letters on a task than did low level anxiety students. These contradictory results suggested that further research is needed to investigate the affects of anxiety and its relationship to cognitive processing and performance on achievement tests.

Based on these prior inconsistencies, Fasko (1991) conducted a study to investigate the effects of anxiety on students' confidence in responding to HOQs and LOQs on self-reported attentiveness and achievement. He found a relationship between trait anxiety and attention. Also, females had higher trait anxiety scores than did males.

Also, Fasko's (1991) results support the findings of Fernandez (1976), McKenzie and Henry (1979) and McKenzie and Schadler (1980) in that anxiety may not interact with the type of instructional condition nor with achievement performance. However, they contradict Kreitzberg's (1978) findings that high anxious students performed more poorly on a recall task than did low anxious students, and also Gaudry and Spielberger's (1971) findings that high student anxiety is associated generally with low achievement performance.

According to Spielberger and Krasner (1988), some situations are inherently more

stressful than others. Also, Mandler and Watson (1966) argued that under certain conditions anxiety would be elicited when there was an interruption in some behavioral sequence. Perhaps the question conditions in Fasko (1991) were not stressful enough to increase students' anxiety. Or as Spielberger and Krasner (1988) pointed out in related research, perhaps these students reappraised the question conditions as being less threatening. This, in turn, should reduce S-anxiety, which is supported by Fasko's (1991) results.

In addition, Sarason (1975) reported that high levels of anxiety are associated with increased levels of self-preoccupation, which interferes with information processing at three levels. These levels are (1) attention to environmental cues, (2) encoding and transformation of data, and (3) selection of an overt response. Fasko's (1991) results contradict somewhat Sarason's (1975) speculation that anxiety would interfere with attention to environmental cues. That is, the results indicated a positive, although weak, correlation between T-anxiety and attention. Perhaps the situation increased the attentional state of the highly anxious students, thus enhancing their attentiveness during the lecture.

Fasko (1983) contends that to reduce anxiety and increase attentiveness educators should pose an equal mix of HOQs and LOQs during lectures to obtain a more uniform question answering performance. In fact, these results indicated that students in a 50% HOQ-LOQ group reported feeling more confident in their ability to respond accurately to the questions than did students in either the HOQ or LOQ conditions.

In addition, these results indicated that females had higher mean achievement scores on a post-test than did males. Interestingly, females' mean T-anxiety scores were also higher than were males' T-anxiety scores. One could speculate that individuals who are highly anxious

might not do as well on an achievement test than would those who were not highly anxious.

Thus, the contention that anxiety is related to a student's achievement performance and ability to respond to questions was not supported, at least in the oral questioning research reported by Fasko (1991). However, there was some support for a relationship between T-anxiety and perceived attentiveness. Fasko discussed the need to clarify some of these inconsistent results.

One consideration was the use of the STAI (Spielberger, 1983) when measuring differences in S-anxiety in a short period of time. Fasko suggested that perhaps a short Likert scale measuring the anxiety characteristics of feelings of tension, nervousness and worry, which has been defined as "a process of gradual involvement with external threat due to its relevance to some anxiety-inducing content" (Breznitz, 1971, p.271), such as negative expectations of oneself or the situation (Morris, Davis, & Hutchings, 1981), would be more appropriate and less time consuming in this type of study. In fact, Liebert and Morris (1967) suggested that anxiety can be separated into two components, worry, which has been described as a cognitive process (Breznitz, 1971), and emotionality which refers to an individual's perception of the "physiological-affective" elements of the anxiety experience (Morris et al., 1981). This emotionality may be exhibited in behaviors such as nervousness and tension. In fact, Morris et al. (1981) speculated that worry and emotionality were conceptually and qualitatively independent because these anxiety components are aroused by different situations and have different effects on academic performance. Fasko (1991) also suggested that perhaps it is these two components of anxiety that should be measured, not S- or T-anxiety as in the STAI.

Regarding worry and emotionality, Morris et al. (1981) noted that worry is influenced by

the individual's cognitive evaluations of the situation, whereas the cues that trigger the emotionality experience are usually of shorter duration and consist of nonevaluative cues, (e.g., the setting of the classroom). Interestingly, most of the research on worry and emotionality has involved-the effects of "state test anxiety" and some research involved "trait test anxiety" (Morris et al., 1981). However, the concept of worry and emotionality has not been investigated in other anxiety-producing classroom situations, such as teacher questioning and student responses. The present research addressed this issue.

Self-Efficacy

Researchers within the social cognitive paradigm have presented an analysis of human motivation, thought, and action that emphasizes the reciprocal causitive interrelationship among three broad categories of factors. These factors are conceptualized as being (a) environmental events, (b) cognitions and other personal factors, and (c) behaviors (Bandura, 1986).

Within the context of cognition and other personal factors, conceptions of self, self-worth and conceptions of competence to achieve explicit goals (i.e., self-efficacy) affect the selection and construction of environments (Bandura, 1986). Reciprocally, one's assessment of the impact of various contexts is mediated through these same self-processes and operate as "proximal determinates at the very heart of causal processes" (Bandura, 1993, p.). Therefore, self-efficacy, an individual's beliefs about his/her capabilities to control his/her level of functioning within a spedific context or attaining mastery of a specific task, is a pervasive influence in academic and personal achievement, also affecting the goal challenges people set and their commitment to explicit goals (Bandura, 1991).

Being effective and successful in one's intellectual functioning requires more than the acquisition of factual information (i.e., declarative knowledge) and reasoning abilities (i.e., logical operations) for given problems and tasks. Self-regulative social, motivational, and affective factors should also be considered as influential in one's cognitive functioning (Bandura, 1993, p. 118).

Bandura (1986) stated that much of the behavior emitted by a person is motivated and regulated by internal standards and evaluative reactions to one's own actions. Being directive of one's own actions is exercised by asserting one's influence over the environment. In addition, one's capacity to reflect judgementally with regard to his/her capabilities also influences thought and action. The individual is considered to be an active processor of information which is mediated by his/her cognitions and beliefs (Pintrich, Smith, Garcia, & McKeachie, 1993), and thus, assesses his/her perceived effectiveness to engage in particular tasks. These judgements are central and pervasive in a person's ability to affect action (Bandura, 1986). Individuals perform based on their interpretations of these cognitions and beliefs, manifesting associated emotions. An additional factor is the individual's attempt to enlist self-regulative functions (e.g., metacognitive control strategies) toward the attainment of cognized goals (Pintrich et al., 1993).

Therefore, from a social cognitive perspective, it follows that individuals' awareness and utilization of strategies to control the process of knowledge acquisition and understanding (i.e., metacognitive control strategies), their awareness and assessment of their expectancy of success and their self-appraisal of their ability to succeed at a given task (i.e., self-efficacy of learning and performance), their belief that learning outcomes are contingent upon their effort (i.e., control of learning), and their perceptions of worry and emotionality with regard to a specific

task or context would influence to some degree their confidence to perform in certain academic situations (e.g., class discussion and questioning) and their perceptions of attentiveness during class sessions.

The present research concentrated on the typical classroom use of oral questions. A question is defined as a direction given to students to (a) inspect the instructional material or their recall of it, and (b) develop a response (Andre, 1979). Examples of HOQs are questions requiring processes, relationships, applications, syntheses, opinions, and educated guesses. An example of an LOQ is a question that requires information recall (Ryan, 1972). The process of attention must also be defined in order to link questioning with attentiveness. Attention is defined here as a student's on-task behavior, which includes the behavioral attributes of student posture, verbal behavior, and eye contact (Norton & Pettegrew, 1979), as well as listening behavior (Tutolo, 1979), and maintaining an external focus on the speaker and message being transmitted (Friedman, 1992).

Also, several assumptions regarding Spielberger's (1966) State-Trait Anxiety Theory are relevant to this study. For example,

(1) for all situations that are appraised by an individual as threatening, an A-State reaction will be evoked;

(2) individuals with high A-Trait will perceive situations or circumstances that involve failure or threats to self-esteem as more threatening than will persons who are low in A-Trait;

(3) the intensity of the A-State reaction will be proportional to the amount of threat that the situation poses for the individual; (Gaudry & Spielberger, 1971, p. 69).

Thus, it was hypothesized that anxious/worrisome students' attending and responding behaviors would be different between genders and when presented with questions of various cognitive levels during a class lecture. Also, the relationship between metacognitive self-regulation, control of learning beliefs, and anxiety and attending and responding behaviors was investigated.

Method

Participants

The subjects in this study were 80 students in two undergraduate educational psychology classes (n=30) and two undergraduate human growth and development classes (n=50) at a southern university in the United States. There were 30 male and 50 female students. The majority of students were white, with three African-American and one Hispanic-American participant. The students received extra credit for participating in the study.

Instruments

The Worry-Emotionality Scale (WE; Morris, Davis, & Hutchings, 1981) consists of 10 items measuring feelings, attitudes and thoughts as they related to the course, at the time of administration. Items on the scale (revised by the authors) are rated on a five point Likert scale ranging from (1) "the condition is not noticeable" to (5) "the condition is very strong". The score for the measure is obtained by summing the responses. The range of scores is from 10 to 50. Items 1, 3, 5, 7, and 9 measured "emotionality", whereas items 2, 4, 6, 8, and 10 measured "worry". Morris et al. (1981) reported internal consistency correlations of .81 and .86 for the worry and emotionality subscales, respectively.

Four subscales of the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich,

Smith, Garcia, & McKeachie, 1991; Pintrich, Smith, Garcia, & McKeachie, 1993) were used in the assessment of the following learner variables: (a) metacognitive self-regulation, (b) task specific self-efficacy, (c) the learners perceived ability to control their learning and performance, and (d) test anxiety.

The MSLQ is based on a general cognitive view of motivation and learning strategies. The student is seen as an active agent in the processing of information, with their beliefs and cognitions being mediators of instructional input (Pintrich, et al., 1993). The instrument is comprised of two sections, assessing motivation and the use of learning strategies. In total, the instrument consists of 81 items comprising 15 subscales, each scored on a 7-point Likert scale, ranging from 1 (not at all true of me) to 7 (very true of me). The instrument is modular in concept, and therefore, each subscale may be utilized separately, or in any relevant combination, by an instructor or researcher.

For the purposes of this study, four subscales were chosen, which reflect the interests of the authors. The Metacognitive Self-Regulation (MSR) subscale (12 items) focuses on the control and self-regulation components of metacognition, and considers assessment of three general processes or components: (a) planning (e.g., goal setting, task analysis), (b) monitoring (e.g., attentional processing, self-testing), and (c) regulation (e.g., adjusting one's cognitive activities).

The Self-Efficacy for Learning and Performance (SELP) subscale (8 items) assesses two aspects of expectancy toward goal achievement. These are: (a) expectancy for success (i.e., one's performance expectations relating to specific task performance); and, (b) self-efficacy (i.e., self appraisal of one's ability to master a specific task).

The Control of Learning Beliefs (CLB) subscale (4 items) assesses the students' beliefs that their efforts with the task will result in positive outcomes. Students who feel that they have control in their academic performance are more likely to expend energies strategically to affect desired outcomes (Pintrich, et al., 1991).

The Test Anxiety (TANX) subscale (5 items) assesses cognitive concerns and preoccupation (ruminations) with performance associated with testing situations. Test anxiety has been shown to be negatively related to academic performance (e.g., Pintrich, et al., 1991) and is thought to have two factors: (a) worry, a cognitive component comprising negative thoughts that disrupt performance; and (b) an emotionality component referring to affective and physiological aspects of anxiety.

Procedure

Four undergraduate classes were block randomized to groups receiving either HOQs, LOQs, 50% HOQs and 50% LOQs, or NQs. The educational psychology classes were in the HOQ and LOQ conditions, and the human growth and development classes were in the 50% and NQ conditions. Standardized lectures of approximately 30 minutes in duration on assessment and evaluation of academic performance were given to the HOQ and LOQ groups, while the 50% and NQ groups received lectures on intelligence. Except for the NQ condition, the HOQs and LOQs were placed into the lecture at those times which the instructor considered appropriate. Six questions were asked in the experimental groups, which abides with Dillon's (1983) suggestion to ask 10 or fewer questions, and Chuska (1995) who suggested asking four or five open-ended questions in a class period. Each lecturer included a wait-time of four seconds after each posed question before requiring a response (on the QC scale), as suggested by Rowe

(1974).

One week prior to the specific lecture, a test consisting of the Wide Range Vocabulary Test (WRVT) (French, Ekstrom, & Price, 1962) was given to the students. On a subsequent day each class received their respective lecture. Prior to the start of the lecture another test packet including the WE Scale, an attentiveness inventory (AI) and a question confidence scale (QC) were provided to the students. Before and after the lecture the students completed the WE Scale. Students were instructed not to respond to the AI or QC scales until the lecture began. The students in the question and no question groups were given slightly different instructions. Students in the question groups were instructed to rate their confidence to respond to questions asked during the lecture. Those students in the NQ group were instructed to summarize on a blank sheet of paper the material that they heard in the lecture. This activity equalized the presentation time for all four question conditions. The AI scale was completed at the end of the lecture. This test packet was collected at the completion of the lecture. Neither feedback to student responses nor a review period was provided during the experiment. One week later each class was given an achievement test that included either HOQs or LOQs relevant to the lecture they received. The educational psychology posttest consisted of 15 items, and the human growth and development posttest consisted of 10 items. Both posttests were deemed equal in difficulty by the experimenters.

Design

Hierarchical Regression analyses were conducted with treatment conditions (HOQ, LOQ, 50% and NQ), and gender as the independent variables. Hierachical regression analysis was used to test the hypothesis that metacognitive self-regulation and one's perception to control learning

beliefs along with anxiety are predictive of students' perceived confidence in their ability to answer questions correctly, and are predictive of students' attentional behaviors. The dependent variables were question confidence and attention.

Results

Pearson correlations were conducted to determine relationships among the variables. Worry-emotionality (anxiety) difference scores were added to the equation besides the WEpre- and post scores. A negative correlation was found between WEdiff and SELP ($r = -.36$, $p = .003$). Thus, the lower the anxiety score the higher the self-efficacy of learning performance. A positive correlation was found between WEdiff and TANX ($r = .25$, $p = .04$). Thus, the higher the anxiety the higher the test anxiety, which was not surprising to find.

Vocabulary was negatively correlated with TANX ($r = -.23$, $p = .04$) and positively correlated with QC ($r = .33$, $p = .02$). Thus, the higher the test anxiety the lower the vocabulary score. Also, the higher the vocabulary skills the higher the confidence to answer questions accurately.

Attentiveness was positively correlated with MSR ($r = .27$, $p = .03$). Thus, the higher the metacognitive self-regulation the higher the attentiveness score. Question confidence was positively correlated with MSR ($r = .45$, $p = .001$), CLB ($r = ..37$, $p = .01$), and SELP ($r = .33$, $p = .02$). Thus, question confidence was related to higher scores in metacognitive self-regulation, control of learning beliefs, and self-efficacy of learning and performance. (See Table 1.)

Because of these significant correlations, hierachical regression analyses were conducted to determine the best predictors for the attention and question confidence variables. The best predictors for attentiveness were MSR and CLB, which accounted for 10% of the variance (Adj

Rsq = .10), F (2,44)=3.59, p=.04. The Rsq change after adding WEdiff to the formula was .009, which was not significant, F (3,43)=2.52, p=.07.

For question confidence, the best predictors were MSR and CLB, which accounted for 26% of the variance (Adj Rsq = .26), F (2,44)=9.31, p=.0004. The Rsq change after adding WEdiff to the formula was .02, F (3,43)=6.80, p=.008, which significantly accounted for 2% of the variance for QC.

Because these variables were significantly related, analyses of variance (ANOVA) were conducted to determine the effects of questions and gender on attentiveness and question confidence. Vocabulary was to be used as a covariate variable, but the ANOVA indicated a significant treatment effect ($F = 8.34$, $p < .001$). Because of this variability, t-tests were conducted on the pooled data, (HOQs plus LOQs vs 50% plus control group). The t-test indicated that students in the HOQ and LOQ groups had significantly higher mean vocabulary scores than did students in the 50% and control groups, ($M = 23.93$, $sd = 8.77$ and $M = 14.71$, $sd = 7.02$, respectively). Thus, the students in the upper division class (educational psychology) had higher mean scores than did those students in the lower division class (human growth and development). Because of these differences, it was determined not to use vocabulary as a covariate variable in further analyses.

ANOVAs were conducted on the attentiveness and question confidence dependent variables to determine differences between gender and the question conditions. There were no significant interaction nor main effects for attentiveness and for question confidence.

A one between and one within Repeated Measures ANOVA was conducted for the question conditions independent variable and WEpre and WEpost dependent variables. There

was no significant effect in anxiety between the question conditions.

Discussion

The results of this study may clarify some of the previous inconsistent findings involving anxiety and its relationship to students' confidence in their ability to respond to questions accurately, and on their attending behaviors. However, the results may have complicated our understanding of the effects of questions on these variables.

For example, the results do not support Fasko's (1983, 1988, 1991) findings that students were more confident in responding to questions when LOQs were presented. In fact, the present results indicate that there were no differences between the groups in question confidence. Also, the present results do not support Fasko's (1983, 1988, 1991) findings that students were more attentive in the NQ or 50% question conditions. We are puzzled by these results and future research is indicated to clarify these contradictory findings.

Perhaps the differences in verbal abilities contributed to these results. As was mentioned previously, vocabulary was significantly related to question confidence. However, the mean scores of students in the upper division classes were significantly higher than those in the lower division classes.

The correlations showed that anxiety, as measured by the Worry-Emotionality scale Morris et al., 1981), was related negatively to self-efficacy of learning and performance. As might be expected, anxiety was positively related to test anxiety. Thus, these results corroborate prior research (e.g., Pintrich et al., 1991) regarding the negative effects of anxiety on one's self-efficacy towards learning.

A significant relationship of interest was that between vocabulary and question

confidence. This finding seems intuitive in that one would feel more confident about responding accurately to questions if one understands the vocabulary and associated concepts.

Also of interest was the positive correlation between attentiveness and MSR, as well as question confidence and MSR. Question confidence was also related to CLB and SELP, thus supporting Pintrich et al.'s (1993) views that students' beliefs and cognitions affect learning and academic performance.

The hierachical regression analyses indicated that there were differences in regression models associated with students' attentiveness and question confidence. That is, MSR and CLB accounted for 10% of the variance. Anxiety was not a significant contributor to the model for attention. There were also differences for question confidence where MSR and CLB accounted for 26% of the variance. Anxiety contributed 2% to the model for question conficence. Thus, two similar variables for both genders were MSR and CLB. Thus, it appears that students' ability to plan, monitor, and regulate their cognitions are good predictors of their ability to attend to and respond to questions.

In summary, it would appear that the subscales from the MSLQ that were used in this study can be used to predict performance of students when teachers pose questions of different cognitive levels. In addition, the Worry-Emotionality scale used appears to be a more sensitive instrument than the STAI (Spielberger, 1983) in measuring anxiety in situations similar to those in this study. Further research is planned to determine the effects of MSR and CLB on attentiveness and question confidence. In addition, future research is planned to determine whether worry or emotionality is the contributing factor in stimulating anxiety in a typical classroom.

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Authors' Notes

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Table 1.

Correlational Analysis

Variables	WEdiff	VOC	MSR	CLB	TANX	SELP	QC	AI
WEdiff	1.00	-.05 (p=.68)	-.06 (p=.60)	-.09 (p=.45)	.25* (p=.04)	-.36* (p=.003)	-.13 (p=.39)	-.14 (p=.26)
VOC			.07 (p=.54)	.17 (p=.13)	-.23* (p=.04)	.10 (p=.38)	.33* (p=.02)	-.08 (p=.50)
MSR				.17 (p=.13)	-.07 (p=.57)	.29* (p=.01)	.45* (p=.001)	.27* (p=.03)
CLB					.001 (p=.99)	.41* (p<.001)	.37* (p=.01)	-.15 (p=.24)
TANX						-.39* (p<.001)	-.24 (p=.10)	.01 (p=.94)
SELP							.33* (p=.02)	-.05 (p=.68)
QC								.03 (p=.86)
AI								1.00